CLEAR SKIES IN SOUTH CAROLINA[1]

<u>Human Health and Environmental Benefits of Clear Skies</u>: Clear Skies would protect human health, improve air quality, and reduce deposition of sulfur dioxide (SO_2), nitrogen oxides (NO_x), and mercury.[2]

- Beginning in 2020, approximately $3 billion of the annual benefits of Clear Skies would occur in South Carolina. Every year, these would include:
  - over 300 fewer premature deaths;
  - over 200 fewer cases of chronic bronchitis;
  - over 10,000 fewer days with asthma attacks;
  - over 300 fewer hospitalizations and emergency room visits;
  - over 61,000 fewer days of work lost due to respiratory symptoms; and
  - approximately 440,000 fewer total days with respiratory-related symptoms

- By 2010, based on initial modeling:
  - Clear Skies would bring two South Carolina counties (Lexington and Richland—population over 500,000) into attainment with the annual fine particle standard; and
  - all counties would attain the 8-hour ozone standard due to existing Clean Air Act programs.[4]

Clear Skies Benefits Nationwide

- In 2020, annual health benefits from reductions in ozone and fine particles would total $93 billion, including 12,000 fewer premature deaths, far outweighing the $6.49 billion cost of the Clear Skies program.
- Using an alternative methodology results in over 7,000 premature deaths prevented and $11 billion in benefits by 2020—still exceeding the cost of the program.[3]
- Clear Skies would provide an additional $3 billion in benefits due to improved visibility in National Parks and wilderness areas in 2020.

- Based on initial modeling, Clear Skies would bring Greenville county closer to attainment of the annual fine particle standard in 2020.

- Clear Skies delivers numerous environmental benefits by 2020:
  - visibility would improve 2-3 deciviews in western mountainous areas of the state and 1-2 deciviews in the rest of South Carolina (a change of 1 deciview is a perceptible change in visibility);
  - sulfur deposition would decrease 30-60% throughout the state;
  - nitrogen deposition would be reduced by up to 60% in significant portions of the state, including coastal areas where nitrogen deposition contributes to coastal eutrophication, and by 15-30% throughout the rest of the state; and
  - mercury deposition would be reduced by 5-25% throughout the state.

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[1] The projected impacts are the results of extensive emissions and regional air quality modeling and benefits analyses as summarized in the *Technical Addendum: Methodologies for Benefit Analysis of the Clear Skies Initiative, 2002*. While the policy analyses tools EPA used are among the best available, all such national scale policy assessments are subject to a number of uncertainties, particularly when projecting air quality or environmental impacts in particular locations.

[2] All human health and environmental benefits are calculated in comparison to existing Clean Air Act programs.

[3] The two sets of estimates reflect alternative assumptions and analytical approaches regarding quantifying and evaluating the effects of airborne particles on public health. All estimates assume that particles are causally associated with health effects, and that all components have the same toxicity. Linear concentration-response relationships between PM and all health effects are assumed, indicating that reductions in PM have the same impact on health outcomes regardless of the absolute level of PM in a given location. The base estimate relies on estimates of the potential cumulative effect of long-term exposure to particles, while the alternative estimate presumes that PM effects are limited to those that accumulate over much shorter time periods. All such estimates are subject to a number of assumptions and uncertainties. It is of note that, based on recent preliminary findings from the Health Effects Institute, the magnitude of mortality from short-term exposure (alternative estimates) and hospital/ER admissions estimates (both estimates) may be overstated. The alternatives also use different approaches to value health effects damages. The key assumptions, uncertainties, and valuation methodologies underlying the approaches used to produce these results are detailed in the *Technical Addendum* noted above.

[4] To permit comparisons among various analyses, the air quality data used in this analysis was fixed as the most complete and recently available as of mid-2001 (1997-1999 ozone monitoring data and 1999-2000 PM2.5 data). More complete and more recent air quality data for ozone and fine particles (1999-2001 data) indicates some differences in the likely attainment status of some counties. Future analyses of Clear Skies will incorporate the most recent data available.

Changes in Emissions Under Clear Skies: Clear Skies is projected to result in significant emissions reductions from power generators by 2020.

- In South Carolina, Clear Skies is projected to significantly reduce emissions from power generators by 2020 (relative to 2000 emissions):
  - SO_2 emissions would be reduced by 68%;
  - NO_x emissions would be reduced by 70%; and
  - mercury emissions would be reduced by 64%.

Nationwide Emissions under Clear Skies in 2020

- SO_2 emissions from power generators are projected to be 3.9 million tons (a 65% reduction from 2000 levels).
- NO_x emissions are projected to be 1.7 million tons (a 67% reduction from 2000 levels).
- Mercury emissions are projected to be 18 tons (a 63% reduction from 2000 levels).
- At full implementation, the emission reductions would be 73% for SO_2, 67% for NO_x, and 69% for mercury.

Figures 1a, 1b and 1c. *Existing Clean Air Act Regulations (base case[5]) vs. Clear Skies in South Carolina in 2010 and 2020*

Figure 1a. SO_2

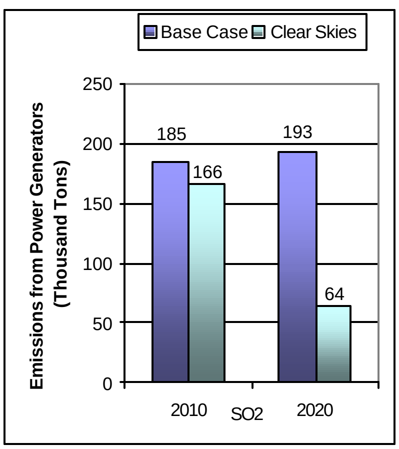


Figure 1b. NO_x

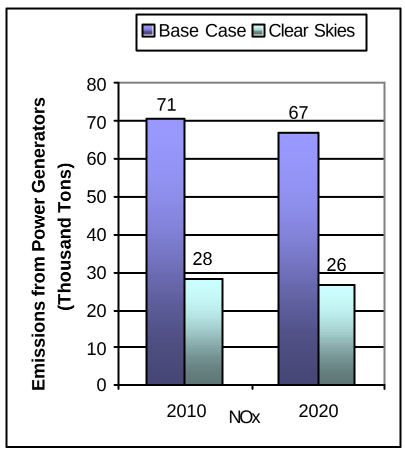
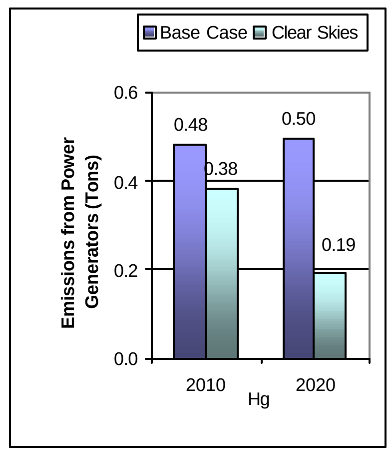


Figure 1c. Mercury



- Emissions rates in South Carolina in 2010 and 2020:

Table 1. *Projected Emissions Rates in 2010 and 2020 in South Carolina*

Year		SO_2	NO_x			Hg
		Coal	All	Coal	Gas	Coal
		lbs/MMBtu	lbs/MMBtu	lbs/MMBtu	lbs/MMBtu	lbs/TBtu
2010	Base Case	0.91	0.32	0.34	0.10	2.37
	Clear Skies	0.85	0.13	0.13	0.10	1.95
2020	Base Case	0.93	0.26	0.31	0.07	2.39
	Clear Skies	0.32	0.10	0.11	0.05	0.95

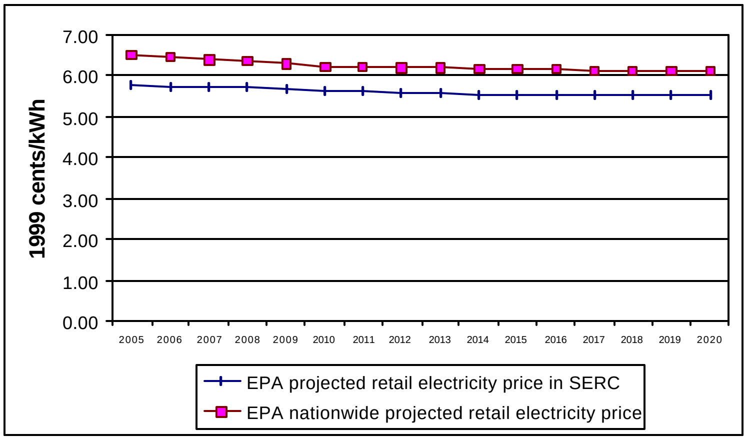
Costs: Nationwide, the projected annual costs of Clear Skies (in $1999) are $3.69 billion in 2010 and $6.49 billion in 2020.[6]

[5] The base case includes Title IV, the NO_x SIP call and State-specific caps in CT, MO and TX. It does not include mercury MACT in 2008 or any other potential future regulations to implement the current Clean Air Act.
[6] EPA uses the Integrated Planning Model (IPM) to project the economic impact of Clear Skies on the power generation sector. IPM disaggregates the power generation sector into specific regions based on properties of the electric transmission system, power market fundamentals, and regional environmental regulations. These regions do not conform to States or EPA region boundaries making some compliance options, such as dispatch, and associated costs impractical to differentiate at a State or Regional level.

Changes in Projected Retail Electricity Prices Under Clear Skies: Electricity prices in South Carolina would not be significantly affected by Clear Skies.

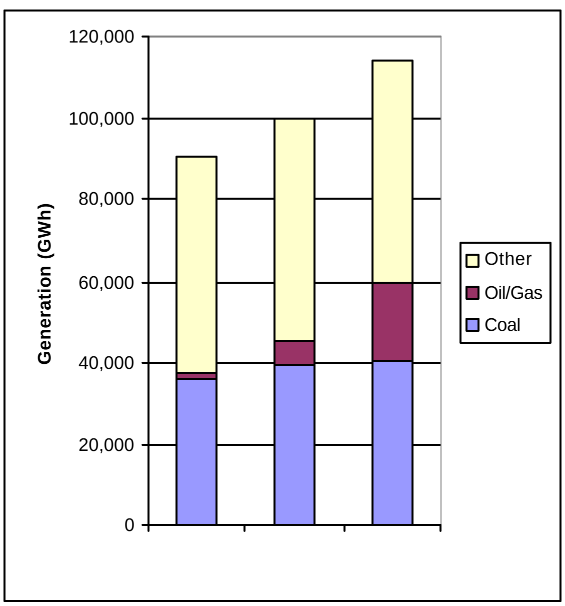
- In 1999, the average retail electricity price in South Carolina was approximately 5.57 cents/kWh, which was below the average *national* retail price of approximately 6.66 cents/kWh.[7] As shown in Figure 3, retail prices in SERC (the North American Electric Reliability Council (NERC) region that contains South Carolina) are projected to decrease and remain below the national average between 2005 and 2020.[8]

***Figure 2**. Projected Retail Electricity Prices in SERC under Clear Skies (2005-2020)*



Generation in South Carolina Under Clear Skies: Coal-fired power plants currently produce 40% of the electricity generated in South Carolina. Although coal-fired generation would continue to increase in the future under Clear Skies, the portion of total generation from coal-fired plants would decrease. In South Carolina, coal-fired generation would decrease to approximately 39% of all generation by 2010 and 36% of all generation by 2020.

***Figure 3**. Current and Projected Generation by Fuel Type in South Carolina under Clear Skies (GWh)*[9]



[7] Source: 1999 EIA data at http://www.eia.doe.gov/cneaf/electricity/page/fact_sheets/retailprice.html

[8] State-level retail electricity prices vary considerably across the United States. Variation in prices can be caused by many factors including access to low cost fuels for generating power, State taxes, and the mix of power plants in the States.

[9] Note: 1999 data from EIA at http://www.eia.doe.gov/cneaf/electricity/st_profiles/south_carolina/sc.html (Table 5).

- EPA does not project that any facilities in South Carolina would switch from coal to natural gas in response to the Clear Skies emissions caps. Instead, sources in South Carolina would reduce their emissions through the installation of control technologies:
  - By 2010, coal-fired capacity in South Carolina is projected to be approximately 15,800 MW under Clear Skies. Approximately 3,900 MW of South Carolina's coal capacity is projected to install Selective Catalytic Reduction (SCR).
  - Between 2010 and 2020, an additional 200 MW are projected to install SCR and 1,900 MW are projected to install scrubbers.

- 78% of South Carolina's coal-fired generation is projected to come from coal units with emission control equipment in 2010, and 83% in 2020. [10]

<u>Coal Production in South Carolina</u>: South Carolina did not produce coal in 2000 and is not projected to produce coal under Clear Skies.

<u>Major Generation Companies in South Carolina</u>: The ten largest plants in the State -- each over 650 MW -- are a combination of nuclear, hydro, petroleum-, gas-, and coal-fired plants. The major electric utilities include: Duke Energy Corporation, South Carolina Electric & Gas Company, South Carolina Public Service Authority, Carolina Power & Light Company, and Berkeley Electric Coop, Inc.

[10] Emissions control equipment includes, where applicable, scrubbers, selective catalytic reduction, selective non-catalytic reduction, gas-reburn and activated carbon injection.